

## VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the Virginia Pollutant Discharge Elimination System (VPDES) permit listed below. This permit is being processed as a Major, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260. The proposed discharge will result from the operation of a municipal sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:

Stuarts Draft WWTP  
Augusta County Service Authority (ACSA)  
P.O. Box 859  
Verona, VA 24482  
Location: 391 Wayne Avenue, Stuarts Draft, VA 24477

2. Permit No. VA0066877; Expiration Date: May 31, 2016

3. Owner: Augusta County Service Authority (ACSA)

Contact Name: Kenneth J. Fanfoni, P.E.  
Title: Executive Director, ACSA  
Telephone No: (540) 245-5670  
Email: kfanfoni@co.augusta.va.us

4. Description of Treatment Works Treating Domestic Sewage:

Stuarts Draft WWTP primarily receives sewage wastewater generated by businesses and private residences within the Stuarts Draft service area with the balance of the flow generated by commercial and industrial contributors (see permit reissuance application Form 2A, Part F). The WWTF has an approved Industrial Pretreatment Program for regulating the non-domestic contributors' wastewater quality. The treatment units comprising the WWTF are shown in the schematics included in the permit reissuance application.

Average Discharge Flow (January 2014 – December 2015) = 1.1 MGD

Design Average Flow = 4.0 MGD

Total Number of Outfalls: 1

5. Application Complete Date: December 4, 2015

Permit Writer: Dawn Jeffries

Date: February 29, 2016

Reviewed By: Bev Carver

Date: March 2, 2016

Public Comment Period:

6. Receiving Stream Name: South River

River Mile: 38.88

Use Impairment: Yes

Special Standards: pH

Tidal Waters: No

Watershed Name: VAV – B31R Middle South River/Back Creek

Basin: Potomac; Subbasin: Shenandoah

Section: 3; Class: IV

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

7. Operator License Requirements per 9VAC25-31-200.C: Class I
8. Reliability Class per 9VAC25-790: II (Assigned December 2, 1981)
9. Permit Characterization:  
☐ Private   ☐ Federal   ☐ State   ☒ POTW   ☐ PVOTW  
☐ Possible Interstate Effect   ☐ Interim Limits in Other Document (attach copy of CSO)
10. Discharge Location Description and Receiving Waters Information: Appendix A
11. Antidegradation (AD) Review & Comments per 9VAC25-260-30:  
Tier Designation: Tier 1

The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The receiving stream in the immediate vicinity downstream of the discharge point is determined to be a Tier 1 water based on the fact that the effluent limits for Ammonia-N were set to give the facility the full waste load allocation (WLA) for Ammonia-N in the South River during the permit reissuance in 1997. Also, the modeling performed at the 1992 reissuance indicated a D.O. sag to 5.01 mg/L, which is essentially the same as the water quality standard of 5.0 mg/L. Antidegradation baselines are not calculated for Tier 1 waters.

12. Impaired Use Status Evaluation per 9VAC25-31-220.D: The South River in the vicinity of the discharge is listed as having elevated levels of bacteria. Additionally, the facility has been assigned the following WLAs in South River TMDLs based on a design flow of 4.0 MGD at the concentrations shown:

Parameter	TMDL WLA	Concentration
E. coli	$6.96 \times 10^{12}$ cfu/year	126 N/100 mL
Sediment	165.8 metric tons/year	TSS = 30 mg/L
Total Phosphorus	2,348.3 kg/year*	0.3 mg/L
Total Recoverable Mercury	21 grams/year (Average daily of 0.058 g/d and maximum daily of 0.12 g/d)	3.8 ng/L

\*This is a combined allocation for ACSA facilities: Stuarts Draft STP, Harriston STP, and Vesper View STP.

13. Site Inspection: Performed by Dawn Jeffries on February 22, 2016
14. Effluent Screening and Effluent Limitations: Appendix B
15. Effluent toxicity testing requirements included per 9VAC25-31-220.D: ☒ Yes   ☐ No   Appendix B
16. Sewage sludge and biosolids utilization and disposal options include the following:
  - transport of dewatered sludge to the Augusta Regional Landfill
  - transport of sludge to Middle River Regional WWTP or Fishersville Regional WWTP for blending, further treatment, and disposal
  - land application of biosolids by Houff's Feed and Fertilizer under VPA Permit No. VPA01566, VPA01580, and/or VPA01581

## **Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

The VPDES Permit application serves as the Sludge Management Plan to be approved with the reissuance of the permit. According to the information submitted with the permit application, this facility produces 179 dry metric tons of biosolids annually. See Part III of the permit for the biosolids limitations and monitoring requirements based on the VPDES Permit Regulation (9VAC25-31) and 40 CFR Part 503.

17. Bases for Special Conditions: Appendix C
18. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.
19. Antibacksliding Review per 9VAC25-31-220.L: This permit complies with the antibacksliding provisions of the VPDES Permit Regulation.
20. Regulation of Users per 9VAC25-31-280.B.9: N/A – This facility is owned by a municipality.
21. Stormwater Management per 9VAC25-31-120: Application Required? ☒ Yes ☐ No  
Because the Augusta County Service Authority has an approved pretreatment program and the Stuarts Draft WWTP receives wastewater from industrial users, a stormwater application is required. A No Exposure Certification (NEC) for Exclusion from VPDES Stormwater Permitting was submitted with the permit reissuance application. The NEC was sent to DEQ inspectors for review and concurrence January 29, 2016. No stormwater requirements have been included in the permit. The NEC is approved with the reissuance of the permit. If conditions change at the facility, and any industrial materials or activities become exposed to stormwater, coverage under a VPDES permit must be obtained prior to any point source discharge of stormwater from the facility.
22. Compliance Schedule per 9VAC25-31-250: There are no compliance schedules included in the reissued permit.
23. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.K, and 100.N: None.
24. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility is owned by a municipality.
25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☒ Yes ☐ No
26. Nutrient Trading Regulation per 9VAC25-820: See Appendix B  
General Permit Required: ☒ Yes ☐ No  
This facility is required to maintain coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen (TN) and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia ("WGP"; 9VAC25-820) because it is listed with a WLA in the Registration List in 9 VAC 25-820-70.
27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☒ No  
This facility is a Significant Discharger as defined in the WGP and is actively monitoring and reporting under the WGP. This permit does not include any outfalls that discharge solely stormwater exposed to industrial activity.
28. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows, T&E screening is not automatically required.

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

However, in accordance with the VPDES Memorandum of Understanding, T&E screening was coordinated on December 4, 2015 through DCR based upon request. Comments were received from DCR on December 30, 2015 and are included in the permit processing file. Comments were considered in the drafting of the permit and were also forwarded to the permittee.

29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Dawn Jeffries at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7898, dawn.jeffries@deq.virginia.gov.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

30. Historical Record:

CTO issued for 0.7 MGD facility	September 21, 1983
P&S approved for dechlorination facilities	February 5, 1988
Pretreatment program in permit	May 24, 1991
CTO issued for 1.4 MGD facility	April 9, 1996
CTO issued for 2.4 MGD facility	March 7, 2003
CTO issued for 4.0 MGD facility	December 6, 2010

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

Stuarts Draft WWTP discharges to the South River in Augusta County. The topographical map below shows the location of the treatment facility and Outfall 001.



## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessments Review table below.

WATER QUALITY ASSESSMENTS REVIEW						
POTOMAC-SHENANDOAH RIVER BASIN						
12/16/2015						
<b>IMPAIRED SEGMENTS</b>						
<u>SEGMENT ID</u>	<u>STREAM</u>	<u>SEGMENT START</u>	<u>SEGMENT END</u>	<u>SEGMENT LENGTH</u>	<u>PARAMETER</u>	
B30R-01-BAC	South River	52.3	40.49	11.81	Fecal Coliform	
B30R-02-PH	Loves Run	5.02	0.00	5.02	pH	
B31R-01-BAC	Back Creek	13.31	0.00	13.31	E-coli	
B31R-01-BEN	Back Creek	13.31	0.00	13.31	Benthic	
B31R-02-BEN	Mills Creek	8.88	0.00	8.88	Benthic	
B31R-03-BEN	Toms Branch	3.35	0.00	3.35	Benthic	
B31R-04-PH	Coles Run	6.1	0.00	6.1	pH	
B31R-05-PH	Johns Run	4.86	0.00	4.86	pH	
B31R-06-PH	Kennedy Creek	9.47	0.00	9.47	pH	
B31R-07-PH	Orebank Creek	3	0.00	3	pH	
B32R-02-BAC	South River	39.74	0.00	39.74	E-coli, Fecal Coliform	
<b>PERMITS</b>						
<u>PERMIT</u>	<u>FACILITY</u>	<u>STREAM</u>	<u>RIVER MILE</u>	<u>LAT</u>	<u>LONG</u>	<u>WBID</u>
<b>VA0066877</b>	<b>Stuarts Draft WWTP</b>	<b>South River</b>	<b>38.88</b>	<b>380107</b>	<b>0790107</b>	<b>VAV-B31R</b>
VA0092100	Coyner Springs WTP	South River UT	1.29	380308	0785556	VAV-B32R
<b>MONITORING STATIONS</b>						
<u>STREAM</u>	<u>NAME</u>	<u>RIVER MILE</u>	<u>RECORD</u>	<u>LAT</u>	<u>LONG</u>	
Christians Creek	1BCST021.76	21.76	7/1/91	380322	0790418	
Coles Run	1BCLS003.60	3.6	4/18/06	375832	0790148	
North Fork Back Cree	1BBKN001.81	1.81	8/14/90	375531	0790013	
South River	1BSTH041.68	41.68	7/1/91	380135	0790404	
South River	1BSTH043.55	43.55	8/27/03	380121	0790540	
South River	1BSTH032.45	32.45	7/7/68	380224	0785706	
South River	1BSTH036.84	36.84	7/7/68	380049	0785921	
South River	1BSTH039.68	39.68	7/7/68	380057	0790157	
South River	1BSTH026.73	26.73	11/6/01	380352	0785426	
South River	1BSTH027.85	27.85	5/17/74	380324	0785428	
South River	1BSTH031.45	31.45	1/20/09	380247	0785633	
Back Creek	1BBCK000.78	0.78	7/1/91	380142	0785554	
South River	1BSTH029.45	29.85	9/20/67	380251	0785516	
Saint Marys River	2-SMR004.80	4.8	8/29/01	375606	0790517	
South River	1BSTH027.08	27.08	10/2/98	380324	0785428	
<b>PUBLIC WATER SUPPLY INTAKES</b>						
<u>OWNER</u>	<u>STREAM</u>	<u>RIVER MILE</u>				
SOUTH RIVER SANIT	COLES RUN RESER	0				
<b>WATER QUALITY MANAGEMENT PLANNING REGULATION</b>						
Is this discharge addressed in the WQMP regulation? Yes						
If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?						
<u>PARAMETER</u>	<u>ALLOCATION</u>					
Nutrients Under the Watershed General Permit						
<b>WATERSHED NAME</b>						
VAV-B31R Middle South River/Back Creek						

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### FLOW FREQUENCY DETERMINATION

The VDEQ conducted flow measurements of the South River from 1997 to 2002. The individual measurements were made just upstream of the subject WWTP discharge point (#01625847). The measurements were correlated with the same-day daily mean values from the continuous record gage on the South River near Waynesboro (#01626000). The correlation was done by plotting the measurements and the daily mean values on a log/log graph, and performing a regression analysis. The measurements correlated well with the South River gage. A best-fit line (and equation) for the data set was established. The required flow frequencies for the South River at the Stuarts Draft WWTP discharge point were then calculated using the equation of the line and the flow frequencies for the entire period of record of the South River gage. The flow frequencies for the South River gage and the calculated flow frequencies for the measurement site/discharge point are presented below:

#### **South River near Waynesboro, VA (#01626000):**

Drainage Area = 127 mi <sup>2</sup>			
1Q30 =	19.4 cfs	High Flow 1Q10 =	33.2 cfs
1Q10 =	22.0 cfs	High Flow 7Q10 =	36.2 cfs
7Q10 =	23.2 cfs	High Flow 30Q10 =	43.3 cfs
30Q10 =	25.0 cfs	HM =	65.7 cfs
30Q5 =	26.9 cfs		

#### **South River at Stuarts Draft STP discharge point:**

Drainage Area = 52.1 mi <sup>2</sup>					
1Q30 =	2.07 cfs	(1.34 mgd)	High Flow 1Q10 =	4.80 cfs	(3.10 mgd)
1Q10 =	2.52 cfs	(1.63 mgd)	High Flow 7Q10 =	5.49 cfs	(3.55 mgd)
7Q10 =	2.74 cfs	(1.77 mgd)	High Flow 30Q10 =	7.28 cfs	(4.70 mgd)
30Q10 =	3.08 cfs	(1.99 mgd)	HM =	14.0 cfs	(9.04 mgd)
30Q5 =	3.45 cfs	(2.23 mgd)			

The high flow months are January through May.

The analysis assumes that there are no significant discharges, withdrawals, or springs that may influence the flow in the South River upstream of the discharge point.

REVIEWER: BWC

DATE: 2/19/16

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

#### **Annual Mix**

Effluent Flow = 4.0 MGD  
Stream 7Q10 = 1.77 MGD  
Stream 30Q10 = 1.99 MGD  
Stream 1Q10 = 1.63 MGD  
Stream slope = 0.0011 ft/ft  
Stream width = 12 ft  
Bottom scale = 1  
Channel scale = 1

-----

#### Mixing Zone Predictions @ 7Q10

Depth = .891 ft  
Length = 303.79 ft  
Velocity = .8348 ft/sec  
Residence Time = .0042 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

-----

#### Mixing Zone Predictions @ 30Q10

Depth = .9129 ft  
Length = 296.99 ft  
Velocity = .8464 ft/sec  
Residence Time = .0041 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

-----

#### Mixing Zone Predictions @ 1Q10

Depth = .8773 ft  
Length = 308.16 ft  
Velocity = .8273 ft/sec  
Residence Time = .1035 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

#### **Wet Season Mix**

Effluent Flow = 4.0 MGD  
Stream 7Q10 = 3.55 MGD  
Stream 30Q10 = 4.70 MGD  
Stream 1Q10 = 3.10 MGD  
Stream slope = 0.0011 ft/ft  
Stream width = 12 ft  
Bottom scale = 1  
Channel scale = 1

-----

#### Mixing Zone Predictions @ 7Q10

Depth = 1.0577 ft  
Length = 259.06 ft  
Velocity = .9208 ft/sec  
Residence Time = .0033 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

-----

#### Mixing Zone Predictions @ 30Q10

Depth = 1.1579 ft  
Length = 238.03 ft  
Velocity = .969 ft/sec  
Residence Time = .0028 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

-----

#### Mixing Zone Predictions @ 1Q10

Depth = 1.0171 ft  
Length = 268.68 ft  
Velocity = .9005 ft/sec  
Residence Time = .0829 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.



## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### SITE VISIT

On February 22, 2016 the writer performed a site visit at the subject facility. Jean Andrews and Doug Ayres of ACSA were also present. The site visit included a visual inspection of the South River at the outfall and at the bridges on Patton Farm Road (Rt. 634) and Shalom Road (Rt. 632). Although flows were high and visibility somewhat limited, stream conditions and channel characteristics appear to be consistent with those noted in the model.



Upstream view from outfall



Downstream view from outfall



Upstream view from 634 bridge



Downstream view 634 bridge



Upstream view from 632 bridge



Downstream view 632 bridge

## APPENDIX B

## EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

## Outfall 001

## Final Limits

## Design Flow: 4.0 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Average		-----	-----
BOD <sub>5</sub>	3,4,6	10 mg/L	150 kg/d	15 mg/L	230 kg/d	3/Week Every other day	24 HC
TSS	2,5	30 mg/L	450 kg/d	45 mg/L	680 kg/d	1/Month	24 HC
Ammonia-N (mg/L)	3	1.6		2.0		1/Week	24 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.010		0.011		12/Day	Grab
E. coli (N/100 mL) (geometric mean)	3,5	126		NA		4/Month in any month of each calendar quarter * or 3/Week** 10 am to 4 pm	Grab
-----	-----	Annual Average		Maximum		-----	-----
TP – Year to Date (mg/L)	7	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	7,8	0.30		NA		1/Year	Calculated
TN – Year to Date (mg/L)	7	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	7,8	4.0		NA		1/Year	Calculated
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.1		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,6	1.0		NA		12/Day	Grab

Refer to permit for definitions of monitoring frequencies and sample types

\* Applicable only when chlorination is used for disinfection

\*\* Applicable if an alternative to chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9VAC25-260)
4. Regional Stream Model Simulation
5. South River TMDLs
6. Best Professional Judgment (BPJ)
7. Guidance Memo No. 07-2008, Amendment No. 2
8. Technology Regulation (9VAC25-40)

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### Outfall 999\*

### Final Limits

**Design Flow: 4.0 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Annual Average	Maximum	Frequency	Sample Type
TP – Calendar Year	1	NA	5,177 (lb/yr) **	1/Year	Calculated

\*Outfall 999 is not an existing discharge point. It is a means for reporting total loads discharged of TP.

\*\* The maximum TP is a combined allocation for the following Augusta County Service Authority facilities: Stuarts Draft WWTP (VA0066877), Vesper View STP (VA0067962), and Harriston WWTP (VA0027901). The TMDL WLA is expressed as 2348.3 kg/yr. The ACSA requested that the limit be expressed as lb/yr to be consistent with the units used in their Nutrient General Permit VAN010092.

### Bases for Effluent Limitations

1. South River TMDL for TP approved December 3, 2009

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9VAC25-720)	
A. TMDL limits	<b>TSS, E. coli, TP, Total Recoverable Mercury</b>
B. Non-TMDL WLAs	<b>None</b>
C. CBP (TN & TP) WLAs	<b>TN, TP by coverage under VAN010092</b>
Federal Effluent Guidelines	<b>BOD<sub>5</sub>, TSS, pH</b>
BPJ/Agency Guidance limits	<b>TRC (contact)</b>
Water Quality-based Limits - numeric	<b>BOD<sub>5</sub>, DO, TRC (effluent), E. coli, pH, Ammonia-N</b>
Water Quality-based Limits - narrative	<b>None</b>
Technology-based Limits (9VAC25-40-70)	<b>TN, TP</b>
Whole Effluent Toxicity (WET)	<b>See pages B-14 to B-17</b>
Storm Water Limits	<b>NEC approved with reissuance of the permit</b>

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:

The stream model for this facility was updated at this reissuance to reflect current stream conditions. The model is maintained in the DEQ-Valley Regional Office and is available for review upon request.

Based on the Regional Stream Model, it was determined that the following values are protective of WQS for DO:

	<u>(Jun-Dec)</u>	<u>(Jan-May)</u>
CBOD <sub>5</sub> (mg/L)	10	10
TKN (mg/L)	3.0	5.5
DO (mg/L)	7.1	7.1

Because a BOD<sub>5</sub> concentration of 10 mg/L is more conservative than a CBOD<sub>5</sub> concentration of 10 mg/L, a BOD<sub>5</sub> permit limit of 10 mg/L has been carried forward from the previous permit. Baseline monitoring frequency is 1/Day for this facility. The permittee requested to continue the reduced monitoring frequency that was previously granted of 3/Week for BOD<sub>5</sub>. The facility has had no compliance or enforcement problems in the past three years and therefore remains eligible for this reduction. As specified in Guidance Memo No. 14-2003, the three-year average effluent BOD<sub>5</sub> concentration of 1.2 mg/L was compared to the permit limit of 10 mg/L. Because the ratio of the average effluent BOD<sub>5</sub> concentration to the monthly average permit limit was less than 25%, the reduced monitoring frequency of 3/Week has been carried forward from the previous permit. Further reduction in frequency has not been granted since reductions are based upon evaluation of data sets gathered with baseline frequency. The permittee is expected to take all appropriate measures to control both the average level of pollutants of concern in the discharge as well as the variability of such parameters in the discharge, regardless of any reductions in monitoring frequencies granted from the baseline levels. A special condition has been included in the permit that requires increased monitoring for all parameters with reduced monitoring if the facility is issued a Notice of Violation for any of these parameters.

The modeled TKN values are more than twice the Ammonia-N WLAc. TKN limits are not necessary when the modeled TKN effluent concentration is more than twice the Ammonia-N WLAc. The Ammonia-N limits (based on chronic toxicity) imposed in the permit are deemed adequate for ensuring compliance with the modeled TKN values, and no TKN limits have been included in this permit.

The DO limit has been carried forward from the previous permit.

The TSS limits are as prescribed by the Secondary Treatment Regulation, are consistent with the TMDL WLA, and have been carried forward from the previous permit.

The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit.

### EVALUATION OF THE EFFLUENT – DISINFECTION:

The E. coli limit has been carried forward from the previous permit. The facility currently utilizes UV disinfection. Based on the system design and past performance, and the fact that the UV system includes alarms on the transmissivity and intensity meters for the UV lights, the E. coli monitoring frequency of 3/Week has also been carried forward. The E. coli limit is consistent with the TMDL WLA of  $6.96 \times 10^{12}$  cfu/yr and is protective of the current WQS for E. coli in the receiving stream. Chlorine limits are also specified in the permit, but are only applicable should the facility utilize chlorine disinfection. In addition to the minimum TRC contact requirements, E. coli monitoring at a frequency of 4/Month sampling during at least 1 month in each calendar quarter of the permit term has been imposed to demonstrate compliance with the monthly geometric mean limit and to ensure adequate disinfection. This additional E. coli monitoring has been imposed in accordance with Guidance Memo No. 14-2003.

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with § 62.1-44.19:14.C.5. of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for TN and TP Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) (WGP). The load limit for TN is 48,729 pounds per calendar year and TP is 3,655 pounds per calendar year.

Stuarts Draft WWTP is “bubbled” with their other facilities. The WGP Regulation stipulates the inclusion of technology-based effluent concentration limits in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade. Technology based annual average effluent concentration limits of TN = 4.0 mg/L and TP = 0.3 mg/L have been carried forward.

This facility was also included in the South River TMDL with a TP WLA of 2,348.3 kg/year, which is a combined allocation for the following ACSA facilities: Stuarts Draft WWTP, Harriston WWTP, and Vesper View STP. The TP contribution from this facility was calculated from a 4.0 MGD flow and 0.3 mg/L TP concentration. The permit limits combined TP at 2,348.3 kg/yr as a maximum based on the South River TMDL. The permittee requested that the TP limit of 2,348.3 kg/year be expressed as 5,177 lb/year in the permit to be consistent with the units used in the Nutrient General Permit. A compliance schedule for meeting this limit has not been included. The requirement is applied in Part I.A.2 since it applies to several facilities as one requirement.

### EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1BSTH041.68 on the South River at the Route 656 Bridge. A Flow Frequency Determination for the receiving stream was generated December 1, 2015, and is included in Appendix A. The “Wet Season” or “High Flow” months are January through May.

Stream Information			
90% Annual Temp (°C) =	22.7	90% pH (SU) =	8.6
90% Wet Temp (°C) =	17.2	10% pH (SU) =	7.8
Mean Hardness (mg/L) =	169		

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH values were obtained from the daily operational data submitted by the permittee. The temperature values were carried forward from the previous fact sheet. The hardness value was obtained from data submitted by the permittee with the application and with WET test results during the current permit cycle.

Effluent Information			
90% Annual Temp (°C) =	24	90% pH (SU) =	8.1
90% Wet Temp (°C) =	18	10% pH (SU) =	7.4
Mean Hardness (mg/L) =	131		

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- TRC: Limits indicated for TRC are identical to those in the previous permit and have been carried forward.
- Ammonia-N: More stringent Ammonia-N limits have been determined to be necessary. This change is due to an increased effluent 90<sup>th</sup> percentile pH. Based on the facility's effluent data combined with the fact that the facility is designed to meet an annual average TN limit of 4.0 mg/L, a schedule of compliance for meeting the more stringent Ammonia-N limits has not been provided. The permittee requested to continue the previously reduced monitoring frequency of 1/Week for Ammonia-N. The facility has had no compliance or enforcement problems in the past three years and therefore remains eligible for this reduction. As specified in Guidance Memo No. 14-2003, the three-year average effluent Ammonia-N concentration of 0.0053 mg/L was compared to the permit limit of 1.6 mg/L. Because the ratio of the average effluent Ammonia-N concentration to the monthly average permit limit was less than 25%, the reduced monitoring frequency of 1/Week has been carried forward from the previous permit. This Ammonia-N limit applies throughout the year since the permittee has requested and received a reduced monitoring frequency and Guidance Memo No. 14-2003 stipulates that parameters with seasonal limits are not eligible for reduced monitoring frequency. The permittee is expected to take all appropriate measures to control both the average level of pollutants of concern in the discharge as well as the variability of such parameters in the discharge, regardless of any reductions in monitoring frequencies granted from the baseline levels. A special condition has been included in the permit that requires increased monitoring for all parameters with reduced monitoring if the facility is issued a Notice of Violation for any of these parameters.
- Monitoring data is needed for the pollutants listed in Attachment A of the permit. The permittee must monitor the effluent at Outfall 001 for the substances noted in Attachment A of the permit once after the start of the third year from the permit's effective date.

### Total Recoverable Mercury

The South River in the vicinity of the discharge is listed as having a fish consumption advisory due to the documented presence of mercury in fish tissue. The South River TMDL approved June 6, 2010, includes a mercury WLA of 21 grams/yr for this facility with a target concentration of 3.8 ng/L. In the previous permit, this allocation was addressed through a special condition for mercury monitoring (at least two sampling events) and minimization. Results for both samples were <1 ng/L, and the permittee has requested that this monitoring requirement be discontinued. Due to the TMDL WLA for this facility, the permit must address this pollutant; therefore, the requirement for mercury monitoring and minimization has been continued in the reissued permit with at least one monitoring event required with a target mercury concentration of 3.8 ng/L.

# Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

## WQC-WLA SPREADSHEET INPUT

### WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:

Stuarts Draft WWTP

Receiving Stream:

South River

Permit No.: VA0066877

Date: 2/4/2016

Version: OWP Guidance Memo 00-2011 (8/24/00)

#### Stream Information

Mean Hardness (as CaCO<sub>3</sub>) = 169 mg/L  
 90% Temperature (Annual) = 22.7 deg C  
 90% Temperature (Wet season) = 17.2 deg C  
 90% Maximum pH = 8.6 SU  
 10% Maximum pH = 7.8 SU  
 Tier Designation = 1  
 Public Water Supply (PWS) Y/N? = N  
 V(alley) or P(iedmont)? = V  
 Trout Present Y/N? = N  
 Early Life Stages Present Y/N? = Y

#### Stream Flows

1Q10 (Annual) = 1.63 MGD  
 7Q10 (Annual) = 1.77 MGD  
 30Q10 (Annual) = 1.99 MGD  
 1Q10 (Wet season) = 3.1 MGD  
 30Q10 (Wet season) = 4.7 MGD  
 30Q5 = 2.23 MGD  
 Harmonic Mean = 9.04 MGD

#### Mixing Information

Annual - 1Q10 Flow = 100 %  
 - 7Q10 Flow = 100 %  
 - 30Q10 Flow = 100 %  
 Wet Season - 1Q10 Flow = 100 %  
 - 30Q10 Flow = 100 %

#### Effluent Information

Mean Hardness (as CaCO<sub>3</sub>) = 188 mg/L  
 90% Temp (Annual) = 24 deg C  
 90% Temp (Wet season) = 18 deg C  
 90% Maximum pH = 8.1 SU  
 10% Maximum pH = 7.4 SU  
 Current Discharge Flow = 4.0 MGD  
 Discharge Flow for Limit Analysis = 4.0 MGD

#### Footnotes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
- All flow values are expressed as Million Gallons per Day (MGD).
- Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
- Hardness expressed as mg/l CaCO<sub>3</sub>. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO<sub>3</sub>.
- "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
- Carcinogen "Y" indicates carcinogenic parameter.
- Ammonia WQs selected from separate tables, based on pH and temperature.
- Metals measured as Dissolved, unless specified otherwise.
- WLA = Waste Load Allocation (based on standards).
- WLA = Waste Load Allocation (based on standards).
- WLAs are based on mass balances (less background, if data exist).
- Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
- Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
- Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
- Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

## WQC-WLA SPREADSHEET OUTPUT

Facility Name:

Stuarts Draft WWTP

Receiving Stream:

South River

Permit No.:

VA0066877

Date:

3/15/2016

### WATER QUALITY CRITERIA

4.0 MGD Discharge Flow - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Human Health			
		Aquatic Protection		Public Water	Other Surface
		Acute	Chronic	Supplies	Waters
Ammonia-N (Annual)	N	5.8E+00 mg/L	9.8E-01 mg/L	None	None
Ammonia-N (Wet Season)	N	5.2E+00 mg/L	1.3E+00 mg/L	None	None
Antimony	N	None	None	5.6E+00	6.4E+02
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None
Chloride	N	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None
Chromium (+3)	N	9.3E+02	1.2E+02	None	None
Chromium (+6)	N	1.6E+01	1.1E+01	None	None
Copper	N	2.4E+01	1.5E+01	1.3E+03	None
Lead	N	2.6E+02	2.9E+01	1.5E+01	None
Nickel	N	3.0E+02	3.4E+01	6.1E+02	4.6E+03
Silver	N	9.7E+00	None	None	None
Zinc	N	2.0E+02	2.0E+02	7.4E+03	2.6E+04

### NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS

4.0 MGD Discharge - Mix per "Mixer"

Aquatic Protection		Human
Acute	Chronic	Health
8.1E+00 mg/L	1.5E+00 mg/L	N/A
9.2E+00 mg/L	2.7E+00 mg/L	N/A
N/A	N/A	1.0E+03
4.8E+02	2.2E+02	N/A
1.2E+03 mg/L	3.3E+02 mg/L	N/A
2.7E-02 mg/L	1.6E-02 mg/L	N/A
1.3E+03	1.7E+02	N/A
2.3E+01	1.6E+01	N/A
3.3E+01	2.2E+01	N/A
3.6E+02	4.2E+01	N/A
4.3E+02	4.9E+01	7.2E+03
1.4E+01	N/A	N/A
2.7E+02	2.8E+02	4.0E+04



**PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS**

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs ( $WLA_a$  and  $WLA_c$ ) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs ( $WLA_{hh}$ ) were analyzed according to the same protocol through a simple comparison with the effluent data. If the  $WLA_{hh}$  exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the  $WLA_{hh}$ , the  $WLA_{hh}$  was imposed as the limit.

Since there are no data available for any toxic pollutants immediately upstream of this discharge, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

- A. If all data are reported as "below detection" or  $<$  the Quantification Level (QL) and at least one detection level is  $\leq$  the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
- B. If all data are reported as "below detection", and all detection levels are  $>$  the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.
  - B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
  - B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.
- C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.
  - C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
  - C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
  - C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.



## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
<b>METALS</b>					
Antimony, dissolved	7440-36-0	0.2	<5	b	B.1
Arsenic, dissolved	7440-38-2	1.0	<5	b	B.1
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	<0.255	b	A
Chromium III, dissolved	16065-83-1	0.5	<1	b	B.1
Chromium VI, dissolved	18540-29-9	0.5	<1	b	B.1
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	4	b	C.1
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	<5	b	B.1
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	<0.001, <0.001	b,d	A
Nickel, dissolved	7440-02-0	0.5	<5	b	B.1
Selenium, total recoverable	7782-49-2	2.0	<1, <5, <5, <5	b,c	A
Silver, dissolved	7440-22-4	0.2	<1	b	B.1
Thallium, dissolved	7440-28-0	---	<5	b	A
Zinc, dissolved	7440-66-6	2.0	46	b	C.1
<b>PESTICIDES/PCBS</b>					
Aldrin <sup>c</sup>	309-00-2	0.05	<0.05, <5	b,c	A
Chlordane <sup>c</sup>	57-74-9	0.2	<0.2, <5	b,c	A
Chlorpyrifos	2921-88-2	---	<0.2	b	A
DDD <sup>c</sup>	72-54-8	0.1	<0.05, <5	b,c	A
DDE <sup>c</sup>	72-55-9	0.1	<0.05, <5	b,c	A
DDT <sup>c</sup>	50-29-3	0.1	<0.05, <5	b,c	A
Demeton	8065-48-3	---	<1	b	A
Diazinon	333-41-5	---	<1	b	A
Dieldrin <sup>c</sup>	60-57-1	0.1	<0.05, <5	b,c	A
Alpha-Endosulfan	959-98-8	0.1	<0.05, <5	b,c	A
Beta-Endosulfan	33213-65-9	0.1	<0.05, <5	b,c	A
Alpha-Endosulfan + Beta-Endosulfan		---	<0.1, <10	b,c	A
Endosulfan Sulfate	1031-07-8	0.1	<0.05, <5	b,c	A
Endrin	72-20-8	0.1	<0.05, <5	b,c	A
Endrin Aldehyde	7421-93-4	---	<0.05	b	A
Guthion	86-50-0	---	<1	b	A
Heptachlor <sup>c</sup>	76-44-8	0.05	<0.05, <5	b,c	A
Heptachlor Epoxide <sup>c</sup>	1024-57-3	---	<0.05, <5	b,c	A
Hexachlorocyclohexane Alpha-BHC <sup>c</sup>	319-84-6	---	<0.05, <5	b,c	A
Hexachlorocyclohexane Beta-BHC <sup>c</sup>	319-85-7	---	<0.05, <5	b,c	A
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	<0.05, <5	b,c	A
Kepone	143-50-0	---	<5	b	A
Malathion	121-75-5	---	<1	b	A
Methoxychlor	72-43-5	---	<0.05	b	A

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Mirex	2385-85-5	---	<0.05	b	A
Parathion	56-38-2	---	<1	b	A
PCB Total <sup>C</sup>	1336-36-3	7.0	<0.5	b	A
Toxaphene <sup>C</sup>	8001-35-2	5.0	<0.5, <20	b,c	A
<b>BASE NEUTRAL EXTRACTABLES</b>					
Acenaphthene	83-32-9	10.0	<5, <5, <5, <5	b,c	A
Anthracene	120-12-7	10.0	<5, <5, <5, <5	b,c	A
Benzidine <sup>C</sup>	92-87-5	---	<5, <5, <5, <5	b,c	A
Benzo (a) anthracene <sup>C</sup>	56-55-3	10.0	<5, <5, <5, <5	b,c	A
Benzo (b) fluoranthene <sup>C</sup>	205-99-2	10.0	<5, <5, <5, <5	b,c	A
Benzo (k) fluoranthene <sup>C</sup>	207-08-9	10.0	<5, <5, <5, <5	b,c	A
Benzo (a) pyrene <sup>C</sup>	50-32-8	10.0	<5, <5, <5, <5	b,c	A
Bis 2-Chloroethyl Ether <sup>C</sup>	111-44-4	---	<5, <5, <5, <5	b,c	A
Bis 2-Chloroisopropyl Ether	108-60-1	---	<5, <5, <5, <5	b,c	A
Bis-2-Ethylhexyl Phthalate <sup>C</sup>	117-81-7	10.0	<5, <5, <5, <5	b,c	A
Butyl benzyl phthalate	85-68-7	10.0	<5, <5, <5, <5	b,c	A
2-Chloronaphthalene	91-58-7	---	<5, <5, <5, <5	b,c	A
Chrysene <sup>C</sup>	218-01-9	10.0	<5, <5, <5, <5	b,c	A
Dibenz(a,h)anthracene <sup>C</sup>	53-70-3	20.0	<5, <5, <5, <5	b,c	A
1,2-Dichlorobenzene	95-50-1	10.0	<5, <5, <5, <5	b,c	A
1,3-Dichlorobenzene	541-73-1	10.0	<5, <5, <5, <5	b,c	A
1,4-Dichlorobenzene	106-46-7	10.0	<5, <5, <5, <5	b,c	A
3,3-Dichlorobenzidine <sup>C</sup>	91-94-1	---	<5, <5, <5, <5	b,c	A
Diethyl phthalate	84-66-2	10.0	<5, <5, <5, <5	b,c	A
Dimethyl phthalate	131-11-3	---	<5, <5, <5, <5	b,c	A
Di-n-Butyl Phthalate	84-74-2	10.0	<5, <5, <5, <5	b,c	A
2,4-Dinitrotoluene	121-14-2	10.0	<5, <5, <5, <5	b,c	A
1,2-Diphenylhydrazine <sup>C</sup>	122-66-7	---	<5, <5, <5, <5	b,c	A
Fluoranthene	206-44-0	10.0	<5, <5, <5, <5	b,c	A
Fluorene	86-73-7	10.0	<5, <5, <5, <5	b,c	A
Hexachlorobenzene <sup>C</sup>	118-74-1	---	<5, <5, <5, <5	b,c	A
Hexachlorobutadiene <sup>C</sup>	87-68-3	---	<5, <5, <5, <5	b,c	A
Hexachlorocyclopentadiene	77-47-4	---	<5, <5, <5, <5	b,c	A
Hexachloroethane <sup>C</sup>	67-72-1	---	<5, <5, <5, <5	b,c	A
Indeno(1,2,3-cd)pyrene <sup>C</sup>	193-39-5	20.0	<5, <5, <5, <5	b,c	A
Isophorone <sup>C</sup>	78-59-1	10.0	<5, <5, <5, <5	b,c	A
Nitrobenzene	98-95-3	10.0	<5, <5, <5, <5	b,c	A
N-Nitrosodimethylamine <sup>C</sup>	62-75-9	---	<5, <5, <5, <5	b,c	A
N-Nitrosodi-n-propylamine <sup>C</sup>	621-64-7	---	<5, <5, <5, <5	b,c	A
N-Nitrosodiphenylamine <sup>C</sup>	86-30-6	---	<5, <5, <5, <5	b,c	A
Pyrene	129-00-0	10.0	<5, <5, <5, <5	b,c	A
1,2,4-Trichlorobenzene	120-82-1	10.0	<5, <5, <5, <5	b,c	A

**Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
<b>VOLATILES</b>					
Acrolein	107-02-8	---	<50, <50, <50, <50	b,c	A
Acrylonitrile <sup>C</sup>	107-13-1	---	<50, <50, <50, <50	b,c	A
Benzene <sup>C</sup>	71-43-2	10.0	<5, <5, <5, <5	b,c	A
Bromoform <sup>C</sup>	75-25-2	10.0	<5, <5, <5, <5	b,c	A
Carbon Tetrachloride <sup>C</sup>	56-23-5	10.0	<5, <5, <5, <5	b,c	A
Chlorobenzene	108-90-7	50.0	<5, <5, <5, <5	b,c	A
Chlorodibromomethane <sup>C</sup>	124-48-1	10.0	<5, <5, <5, <5	b,c	A
Chloroform	67-66-3	10.0	<5, <5, <5, <5	b,c	A
Dichlorobromomethane <sup>C</sup>	75-27-4	10.0	<5, <5, <5, <5	b,c	A
1,2-Dichloroethane <sup>C</sup>	107-06-2	10.0	<5, <5, <5, <5	b,c	A
1,1-Dichloroethylene	75-35-4	10.0	<5, <5, <5, <5	b,c	A
1,2-trans-dichloroethylene	156-60-5	---	<5, <5, <5, <5	b,c	A
1,2-Dichloropropane <sup>C</sup>	78-87-5	---	<5, <5, <5, <5	b,c	A
1,3-Dichloropropene <sup>C</sup>	542-75-6	---	<5, <5, <5, <5	b,c	A
Ethylbenzene	100-41-4	10.0	<5, <5, <5, <5	b,c	A
Methyl Bromide	74-83-9	---	<5, <5, <5, <5	b,c	A
Methylene Chloride <sup>C</sup>	75-09-2	20.0	<5, <5, <5, <5	b,c	A
1,1,2,2-Tetrachloroethane <sup>C</sup>	79-34-5	---	<5, <5, <5, <5	b,c	A
Tetrachloroethylene	127-18-4	10.0	<5, <5, <5, <5	b,c	A
Toluene	10-88-3	10.0	<5, <5, <5, <5	b,c	A
1,1,2-Trichloroethane <sup>C</sup>	79-00-5	---	<5, <5, <5, <5	b,c	A
Trichloroethylene <sup>C</sup>	79-01-6	10.0	<5, <5, <5, <5	b,c	A
Vinyl Chloride <sup>C</sup>	75-01-4	10.0	<10, <5, <5, <5	b,c	A
<b>RADIONUCLIDES</b>					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
<b>ACID EXTRACTABLES</b>					
2-Chlorophenol	95-57-8	10.0	<5, <5, <5, <5	b,c	A
2,4-Dichlorophenol	120-83-2	10.0	<5, <5, <5, <5	b,c	A
2,4-Dimethylphenol	105-67-9	10.0	<5, <5, <5, <5	b,c	A
2,4-Dinitrophenol	51-28-5	---	<20, <20, <20, <20	b,c	A
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<5	b	A
Nonylphenol	104-40-51	---	NEW REQUIREMENT. Needs to be sampled.	---	---
Pentachlorophenol <sup>C</sup>	87-86-5	50.0	<10, <10, <10, <10	b,c	A
Phenol	108-95-2	10.0	<5, <5, <5, <5	b,c	A
2,4,6-Trichlorophenol <sup>C</sup>	88-06-2	10.0	<5, <5, <5, <5	b,c	A
<b>MISCELLANEOUS</b>					
Ammonia-N (mg/L)	766-41-7	0.2 mg/L	Default = 9 mg/L	a	C.2
Chloride (mg/L)	16887-00-6	---	55	b	C.1

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	a	C.2
Cyanide, Free	57-12-5	10.0	<5	b	A
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---
Dioxin (2,3,7,8-tetrachlorodibenzo-p- dioxin)(ppq)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Sulfide, dissolved	18496-25-8	100	NEW REQUIREMENT. Needs to be sampled.	---	---
Hydrogen Sulfide	7783064	---	<8	b	A
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	<0.03	b	A
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Hardness (mg/L as CaCO <sub>3</sub> )	471-34-1	---	131	b	---

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10<sup>-5</sup>.

**CASRN** = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

### "Source of Data" codes:

a = default effluent concentration

b = data from permittee monitoring, received 1/10/12

c = data from permittee monitoring, received 11/24/15 with reissuance application

d = data from permittee monitoring received 10/5/12

### "Data Evaluation" codes:

See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

### STAT.EXE RESULTS

<p><b><u>Ammonia-N</u></b> Chronic averaging period = 30 WLAa = 8.1 WLAc = 1.5 Q.L. = 0.2 # samples/mo. = 20 # samples/wk. = 5</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # &lt; Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 3.02650514012447 Average Weekly Limit = 1.97254990483861 Average Monthly Limit = 1.55759622146485</p> <p>The data are: 9</p>	<p><b><u>TRC</u></b> Chronic averaging period = 4 WLAa = 0.027 WLAc = 0.016 Q.L. = 0.1 # samples/mo. = 360 # samples/wk. = 84</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # &lt; Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.34011965448517E-02 Average Weekly Limit = 1.08521253267096E-02 Average Monthly Limit = 0.010188616059645</p> <p>The data are: 20</p>	
<p><b><u>Arsenic, Dissolved</u></b> Chronic averaging period = 4 WLAa = 480 WLAc = 220 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # &lt; Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>	<p><b><u>Chloride</u></b> Chronic averaging period = 4 WLAa = 1200 WLAc = 330 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 55 Variance = 1089 C.V. = 0.6 97th percentile daily values = 133.837 97th percentile 4 day average = 91.5084 97th percentile 30 day average= 66.3329 # &lt; Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 55</p>	<p><b><u>Chromium III, Dissolved</u></b> Chronic averaging period = 4 WLAa = 1300 WLAc = 170 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 1 Variance = .36 C.V. = 0.6 97th percentile daily values = 2.43341 97th percentile 4 day average = 1.66379 97th percentile 30 day average= 1.20605 # &lt; Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 1</p>

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

<p><b><u>Chromium VI, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 23  WLAc = 16  Q.L. = 0.5  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 1  Variance = .36  C.V. = 0.6  97th percentile daily values = 2.43341  97th percentile 4 day average = 1.66379  97th percentile 30 day average= 1.20605  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 1</p>	<p><b><u>Copper, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 33  WLAc = 22  Q.L. = 0.5  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 4  Variance = 5.76  C.V. = 0.6  97th percentile daily values = 9.73367  97th percentile 4 day average = 6.65516  97th percentile 30 day average= 4.82421  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 4</p>	<p><b><u>Lead, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 360  WLAc = 42  Q.L. = 0.5  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 5  Variance = 9  C.V. = 0.6  97th percentile daily values = 12.1670  97th percentile 4 day average = 8.31895  97th percentile 30 day average= 6.03026  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>
<p><b><u>Nickel, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 430  WLAc = 49  Q.L. = 0.5  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 5  Variance = 9  C.V. = 0.6  97th percentile daily values = 12.1670  97th percentile 4 day average = 8.31895  97th percentile 30 day average= 6.03026  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>	<p><b><u>Silver, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 14  WLAc =  Q.L. = 0.2  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 1  Variance = .36  C.V. = 0.6  97th percentile daily values = 2.43341  97th percentile 4 day average = 1.66379  97th percentile 30 day average= 1.20605  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 1</p>	<p><b><u>Zinc, Dissolved</u></b>  Chronic averaging period = 4  WLAa = 270  WLAc = 280  Q.L. = 2.0  # samples/mo. = 1  # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1  Expected Value = 46  Variance = 761.76  C.V. = 0.6  97th percentile daily values = 111.937  97th percentile 4 day average = 76.5343  97th percentile 30 day average= 55.4784  # &lt; Q.L. = 0  Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 46</p>

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Applicability of TMP: DEQ guidance states that a municipal sewage treatment plant with a design flow greater than or equal to 1.0 MGD will be subject to Toxics Management Program (TMP) requirements (TMP Guidance Memo No. 00-2012, 8/4/2000, Part IV.2.A).

Summary of Existing Toxicity Results: The previous permit required annual acute and chronic testing using *Ceriodaphnia dubia* and *Pimephales promelas* after completion of quarterly monitoring for the first 4 quarters. Tables 1 and 2 contain a summary of the toxicity testing results during the term of the permit. These data were evaluated using the procedures outlined in the agency guidance.

Test Species: Per the TMP Guidance and the “published rule” (EPA Form 2A application requirements), both species (*Ceriodaphnia dubia* and *Pimephales promelas*) will be required for testing.

Sample Type: A sample type of 24 hour composite is representative of the discharge.

Criteria for Acute Toxicity Testing: The IWCa is > 33% so the tests are based on the calculation of a valid NOAEC.

Irradiation of Samples: In 2011, the permittee requested approval from Deborah DeBiasi to irradiate effluent samples to be used for future *P.p.* chronic tests due to suspected biological interference. Approval was granted May 1, 2014. In the period between the request and its approval, the permittee conducted the chronic *P.p.* tests using both untreated samples and irradiated samples and reported both test results.

Dilution Series: The recommended dilution series for chronic tests and for acute tests is the 0.5 series starting at 100%.

Calculation of WLAs: Acute and chronic WLAs were generated from the WETLimit10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows.

Stat.exe Limit Evaluation: The WLAs are used in the Department’s Stat.exe program in order to perform a statistical evaluation of the acute and chronic test results expressed as Toxicity Units (TUs). The toxicity data are analyzed separately by species and test type (acute or chronic).

Chronic Stat.exe Limit Evaluation:

The summary of the chronic toxicity testing data in Table 2 showed no chronic toxicity with a No Observed Effect Concentration (NOEC) of 100% in every test for both species. The chronic toxicity data were not run through Stat.exe, because all of the data were so close to the WLA<sub>c</sub>, that they would have triggered a limit even though no toxicity was noted. A chronic WET Limit is not required for either species since the mean of the data did not exceed a TUC of 1.0 (NOEC = 100%). Requirements for annual chronic testing of *Ceriodaphnia dubia* and *Pimephales promelas* will continue.

Acute Stat.exe Limit Evaluation:

The summary of the acute toxicity testing data in Table 1 showed no acute toxicity with a No Observed Adverse Effects Concentration (NOAEC) of 100% in every test for both species. The acute toxicity data were not run through Stat.exe, because all of the data were greater than the WLA<sub>a</sub>, and would have automatically triggered a limit; however, an acute WET Limit is not required for either species since the mean of the data did not exceed a TUC of 1.0 (NOAEC = 100%), which meets the permit criteria for the acute tests. Based on the acute toxicity data, no acute limit is necessary and acute monitoring will not be required. Since future chronic test data can be assessed to some degree for the presence of acute toxicity, the permit can be modified, if necessary, to include acute monitoring or an acute WET limit. The permit contains language that should chronic WET monitoring result in a 48-hour LC<sub>50</sub> ≤ 100%; the permittee must commence acute toxicity testing.

Midpoint Check Stat.exe Evaluation: Because the recommended dilution series is the standard 0.5 series, a midpoint check is not necessary.

Peer Reviewer: Bev Carver

Date: March 23, 2016

**Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

**Table 1**  
**Summary of Acute Toxicity Testing (NOAEC)**

Monitoring Period	Test Start Date	48-Hr. Static Acute <i>Ceriodaphnia dubia</i> (TUa)	48-Hr Static Acute <i>Pimephales promelas</i> (TUa)
1 <sup>st</sup> Quarterly (4/01/11 – 6/30/11)	4/13/11	1.0	1.0
2 <sup>nd</sup> Quarterly (7/01/11 – 9/30/11)	7/27/11	1.0	1.0
3 <sup>rd</sup> Quarterly (10/1/11 – 12/31/11)	10/26/11	1.0	1.0
4 <sup>th</sup> Quarterly (1/1/12 – 3/31/12)	2/1/12	1.0	1.0
1 <sup>st</sup> Annual (1/1/13 – 12/31/13)	5/15/13	1.0	1.0
2 <sup>nd</sup> Annual (1/1/14 – 12/31/14)	6/4/14	1.0	1.0
3 <sup>rd</sup> Annual (1/1/15 – 12/31/15)	8/5/15	1.0	1.0

Notes:

1. CTO issued 12/6/10 for design flow of 4.0 MGD. Permit was reissued on 6/1/11



**Table 2**  
**Summary of Chronic Toxicity Testing**

Monitoring Period	Test Start Date	Chronic 3-Brood Static Renewal Survival and Reproduction <i>Ceriodaphnia dubia</i> (TUC)				Chronic 7-Day Static Renewal Survival and Growth <i>Pimephales promelas</i> (TUC)			
		Survival (TUC)	Repro (TUC)	48-hr LC <sub>50</sub>	Surv in 100%	Survival (TUC)	Growth (TUC)	48-hr LC <sub>50</sub>	Surv in 100%
1st Quarterly	4/12/11	1.0	1.0	>100%	100%	1.0	1.0	>100%	100%
2 <sup>nd</sup> Quarterly	7/26/11	1.0	1.0	>100%	100%	1.0	1.0	>100%	100%
3 <sup>rd</sup> Quarterly <sup>2</sup>	10/25/11	1.0	1.0	>100%	100%	-----	-----	-----	-----
3 <sup>rd</sup> Quarterly P.p. Retest Untreated <sup>3</sup>	12/06/11	-----	-----	-----	-----	1.0	4.0	>100%	90%
3 <sup>rd</sup> Quarterly P.p. Retest UV Irradiated <sup>3</sup>	12/06/11	-----	-----	-----	-----	1.0	1.0	>100%	95%
4 <sup>th</sup> Quarterly Untreated <sup>3,4</sup>	1/31/12	1.0	1.0	>100%	90%	1.0	1.0	>100%	80%
4 <sup>th</sup> Quarterly UV Irradiated, P.p. <sup>3</sup>	1/31/12	-----	-----	-----	-----	1.0	1.0	>100%	88%
1st Annual Untreated <sup>3</sup>	5/14/13	1.0	1.0	>100	100%	1.0	2.0	>100%	82.5%
1 <sup>st</sup> Annual UV Irradiated, P.p. <sup>3</sup>	5/14/13	-----	-----	-----	-----	1.0	1.0	>100	97.5%
2 <sup>nd</sup> Annual UV Irradiated, P.p. <sup>3</sup>	6/3/14	1.0	1.0	>100%	100%	1.0	1.0	>100	100%
3 <sup>rd</sup> Annual UV Irradiated, P.p. <sup>3</sup>	8/4/15	1.0	1.0	>100%	100%	1.0	1.0	>100%	100%

## Notes:

1. CTO issued 12/6/10 for design flow of 4.0 MGD. Permit was reissued on 6/1/11.
2. In order for a toxicity test to be considered valid, the Percent Minimum Significant Difference (PMSD) for *P. promelas* (growth) must be  $\leq 30\%$ . The 3<sup>rd</sup> quarterly chronic test for P.p. had a PMSD of 35%. The permittee was advised that the test was invalid and to retest as soon as possible.
3. In 2011, the permittee requested approval to irradiate future samples prior to testing. However, the request was not approved until 2014. Therefore, the permittee ran both untreated and treated tests in that period. The “untreated” data are listed for informational purposes. Only the UV Irradiated test results are used in the statistical evaluation.
4. The PMSD for *P. promelas* (growth) was 31%. This is slightly greater than the upper limit of 30% so the test could be considered invalid. However, Deborah DeBiasi indicated that the result is acceptable.

# Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

**Table 3**  
**WETLim10.xls Spreadsheet – Outfall 001**

Excel 97		Acute Endpoint/Permit Limit		Use as LC <sub>50</sub> in Special Condition, as TU <sub>a</sub> on DMR	
Revision Date: 12/13/13					
File: WETLIM10.xls (MIX.EXE required also)		ACUTE	100% =	NOAEC	LC <sub>50</sub> = NA % Use as NA TU <sub>a</sub>
		ACUTE WLA <sub>a</sub>	0.42225	Note: Inform the permittee that if the mean of the data exceeds this TU <sub>a</sub> : 1.0 a limit may result using STATS.EXE	
		Chronic Endpoint/Permit Limit		Use as NOEC in Special Condition, as TU <sub>c</sub> on DMR	
		CHRONIC	2.10976398 TU <sub>c</sub>	NOEC =	48 % Use as 2.08 TU <sub>c</sub>
		BOTH*	4.2225001 TU <sub>c</sub>	NOEC =	24 % Use as 4.16 TU <sub>c</sub>
		AML	2.10976398 TU <sub>c</sub>	NOEC =	48 % Use as 2.08 TU <sub>c</sub>
Enter data in the cells with blue type:					
Entry Date:	01/26/16	ACUTE WLA <sub>a,c</sub>	4.2225	Note: Inform the permittee that if the mean of the data exceeds this TU <sub>c</sub> : 1.0	
Facility Name:	Stuarts Draft WWTP	CHRONIC WLA <sub>c</sub>	1.4425	a limit may result using STATS.EXE	
VPDES Number:	VA0066877	* Both means acute expressed as chronic			
Outfall Number:	1	% Flow to be used from MIX.EXE		Diffuser / modeling study?	
Plant Flow:	4 MGD			Enter Y/N n	
Acute 1Q10:	1.63 MGD	100 %		Acute 1 :1	
Chronic 7Q10:	1.77 MGD	100 %		Chronic 1 :1	
Are data available to calculate CV? (Y/N)		N	(Minimum of 10 data points, same species, needed)		Go to Page 2
Are data available to calculate ACR? (Y/N)		N	(NOEC < LC <sub>50</sub> , do not use greater/less than data)		Go to Page 3
IWC <sub>a</sub>	71.04795737 %	Plant flow/plant flow + 1Q10		NOTE: If the IWC <sub>a</sub> is >33%, specify the NOAEC = 100% test/endpoint for use	
IWC <sub>c</sub>	69.32409012 %	Plant flow/plant flow + 7Q10			
Dilution, acute	1.4075	100/IWC <sub>a</sub>			
Dilution, chronic	1.4425	100/IWC <sub>c</sub>			
WLA <sub>a</sub>	0.42225	Instream criterion (0.3 TU <sub>a</sub> ) X's Dilution, acute			
WLA <sub>c</sub>	1.4425	Instream criterion (1.0 TU <sub>c</sub> ) X's Dilution, chronic			
WLA <sub>a,c</sub>	4.2225	ACR X's WLA <sub>a</sub> - converts acute WLA to chronic units			
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)			
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)			
Constants eA	0.4109447	Default = 0.41			
eB	0.6010373	Default = 0.60			
eC	2.4334175	Default = 2.43			
eD	2.4334175	Default = 2.43 (1 samp) No. of sample 1			
**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA <sub>a,c</sub> and MDL using it are driven by the ACR.					
LTA <sub>a,c</sub>	1.735213996	WLA <sub>a,c</sub> X's eA			
LTA <sub>c</sub>	0.866996305	WLA <sub>c</sub> X's eB		Rounded NOEC's %	
MDL** with LTA <sub>a,c</sub>	4.222500104 TU <sub>c</sub>	NOEC =	23.682652	(Protects from acute/chronic toxicity) NOEC = 24 %	
MDL** with LTA <sub>c</sub>	2.109763982 TU <sub>c</sub>	NOEC =	47.398667	(Protects from chronic toxicity) NOEC = 48 %	
AML with lowest LTA	2.109763982 TU <sub>c</sub>	NOEC =	47.398667	Lowest LTA X's eD NOEC = 48	
IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU <sub>c</sub> to TU <sub>a</sub>					
Rounded LC50's %					
MDL with LTA <sub>a,c</sub>	0.42225001 TU <sub>a</sub>	LC50 =	236.826519 %	Use NOAEC=100% LC50 = NA %	
MDL with LTA <sub>c</sub>	0.210976398 TU <sub>a</sub>	LC50 =	473.986668 %	Use NOAEC=100% LC50 = NA %	

**Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

<b>CHRONIC DILUTION SERIES TO RECOMMEND</b>						
			Monitoring		Limit	
			% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean			100	1.000000		
Dilution series to use for limit					48	2.08
Dilution factor to recommend:			0.5		0.692820323	
Dilution series to recommend:			100.0	1.00	100.0	1.00
			50.0	2.00	69.3	1.44
			25.0	4.00	48.0	2.08
			12.5	8.00	33.3	3.01
			6.3	16.00	23.0	4.34
Extra dilutions if needed			3.12	32.05	15.96	6.26
			1.56	64.10	11.06	9.04

**APPENDIX C**

**BASES FOR PERMIT SPECIAL CONDITIONS**

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page	Content and format as prescribed by the Guidance Memo No. 14-2003.
Part I.A.	<p><b>Effluent Limitations and Monitoring Requirements:</b> Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.</p> <p><i>Updates Part I.A.1 of the previous permit with the following:</i></p> <ul style="list-style-type: none"> <li>• More stringent limits for Ammonia-N were included and seasonal limits Ammonia-N limits were removed.</li> <li>• A footnote regarding reduced monitoring frequencies was added.</li> </ul>
Part I.A.2.	<b>Outfall 999:</b> <i>Identical to Part I.A.2 of the previous permit.</i> Bases for effluent limits provided in previous pages of this fact sheet.
Part I.B.	<p><b>Total Residual Chlorine (TRC) and E. coli Limitations and Monitoring Requirements:</b> <i>Updates Part I.B of the previous permit. The language regarding a possible waiver of contact tank chlorine requirements based upon E. coli results was removed. Also, the minimum contact TRC was changed, and the monitoring frequency for E. coli was changed from 4/Month to 4/Month in any month of each calendar quarter.</i> Specifies both disinfection and effluent limits and monitoring requirements should the permittee elect to switch from alternate disinfection to chlorine disinfection. Required by Sewage Collection and Treatment (SCAT) Regulations and 9VAC25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.</p>
Part I.C	<p><b>Effluent Limitations and Monitoring Requirements – Additional Instructions:</b> <i>Updates Part I.C of the previous permit with minor wording changes. Also, the QL for BOD<sub>5</sub> changed from 5 mg/L to 2 mg/L.</i></p> <p>Authorized by VPDES Permit Regulation 9 VAC25-31-190 J.4 and 220.I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.</p> <p>§62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.</p>
Part I.D	<p><b>Pretreatment Program Requirements:</b> <i>Updates Part I.D of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulations.</p>
Part I.E	<p><b>Whole Effluent Toxicity (WET) Requirements:</b> <i>Updates Part I.E of the previous permit with minor wording changes and the removal of acute toxicity testing requirements if chronic test LC50s remain &gt;100%.</i> VPDES Permit Regulation 9VAC25-31-210 and 220.I, requires monitoring in the permit to assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Monitoring requirements are as prescribed by Guidance Memo No. 00-2012.</p>

**Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

Part I.F.1	<b>95% Capacity Reopener:</b> <i>Updates Part I.E.1 of the previous permit with minor wording changes.</i> Required by VPDES Permit Regulation 9VAC25-31-200 B 4 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) permits.
Part I.F.2	<b>Indirect Dischargers:</b> <i>Identical to Part I.E.2 of the previous permit.</i> Required by VPDES Permit Regulation 9VAC25-31-200.B.1 and B.2 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) that receive waste from someone other than the owner of the treatment works.
Part I.F.3	<b>Materials Handling/Storage:</b> <i>Updates Part I.E.3 of the previous permit with minor wording changes.</i> 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.
Part I.F.4	<b>O&amp;M Manual Requirement:</b> <i>Updates Part I.E.4 of the previous permit with changes to what is required to be included in the O&amp;M Manual.</i> Required by Code of Virginia Section 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.F.5	<b>CTC/CTO Requirement:</b> <i>Identical to Part I.E.5 of the previous permit.</i> Required by Code of Virginia 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.F.6	<b>Licensed Operator Requirement:</b> <i>Updates Part I.E.7 of the previous permit with minor wording changes.</i> The VPDES Permit Regulation 9VAC25-31-200.C, the Code of Virginia 54.1-2300 et seq., and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.), require licensure of operators. A class II license is indicated for this facility.
Part I.F.7	<b>Reliability Class:</b> <i>Identical to Part I.E.8 of the previous permit.</i> Required by Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790 for all municipal facilities.
Part I.F.8	<b>Water Quality Criteria Monitoring:</b> <i>Updates Part I.E.9 of the previous permit with different parameters required to be monitored in Attachment A.</i> State Water Control Law Section 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.
Part I.F.9	<b>Treatment Works Closure Plan:</b> <i>Updates Part I.E.10 of the previous permit with minor wording changes.</i> This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure industrial sites and treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the State Water Control Law.

**Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP**

Part I.F.10	<p><b>Reopeners:</b></p> <p>a. <i>Identical to Part I.E.11.a of the previous permit:</i> Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.</p> <p>b. <i>Identical to Part I.E.11.b of the previous permit:</i> 9VAC25-40-70.A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.</p> <p>c. <i>Updates Part I.E.11.c of the previous permit with minor wording changes:</i> 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.</p>
Part I.F.11	<p><b>Suspension of concentration limits for E3/E4 facilities:</b> <i>Identical to Part I.E.12 of the previous permit.</i> 9VAC25-40-70.B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.</p>
Part I.F.12	<p><b>Effluent Monitoring Frequencies:</b> <i>New Requirement.</i> In accordance with Guidance Memo No. 14-2003, a reduction in monitoring frequency has been granted based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limits for which reduced frequencies were granted. If the permittee fails to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.</p>
Part I.G.	<p><b>Mercury Monitoring Requirements:</b> <i>Updates Part I.G of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9 VAC 25-31-220 K requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.</p>
Part II	<p><b>Conditions Applicable to All VPDES Permits:</b> <i>Updates Part II of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.</p>
Part III.A.1	<p><b>Annual Production Monitoring:</b> <i>New requirement.</i> 9VAC25-31.220.I.4 specifies that each permit shall include monitoring requirements for sewage sludge to assure compliance with permit limits.</p>
Part III.A.2	<p><b>Metals Limitations &amp; Monitoring:</b> <i>New requirement.</i> 9VAC25-31.220.I.4 specifies that each permit shall include monitoring requirements for sewage sludge to assure compliance with permit limits.</p>
Part III.A.3	<p><b>Pathogen Reduction Requirements:</b> <i>Updates Part I.F.6.b of the previous permit with more detailed information on the pathogen reduction requirements.</i> 9VAC25-31.220.I.4 specifies that each permit shall include monitoring requirements for sewage sludge to assure compliance with permit limits.</p>
Part III.A.4	<p><b>VAR Requirements:</b> <i>Updates Part I.F.6.b of the previous permit with more detailed information on the VAR requirements.</i> 9VAC25-31.220.I.4 specifies that each permit shall include monitoring requirements for sewage sludge to assure compliance with permit limits.</p>

## Fact Sheet – VPDES Permit No. VA0066877 – Stuarts Draft WWTP

Part III.B.1	<b>Approved Sources of Biosolids:</b> <i>New Requirement.</i> 9VAC25-32-440.D states, “No person shall land apply, market, or distribute biosolids in Virginia unless the biosolids source has been approved by the board.” 9VAC25-32-510.B and C require sewage sludge to be treated to meet biosolids standards prior to delivery to the land application site.
Part IV.B.2	<b>Annual Report:</b> <i>New Requirement.</i> 9VAC25-31-590.A requires the submittal of an annual report postmarked by February 19 for the previous year. 9VAC25-31-220.I.3. provides for the VPDES permit to require monitoring the volume of biosolids and other measurements as appropriate. 9VAC25-31-590.C requires reports be maintained verifying that sludge treatment for pathogen and vector attraction reduction be maintained by the generator and owner (of the permit). 9VAC25-31-190.H. requires the permittee to submit information requested by the board, within a reasonable time, to determine compliance with the permit. Other specific information and maintenance requirements are identified in 9VAC25-20-147.A.
Part III.B.3	<b>Recordkeeping:</b> <i>Updates Part I.F.6 of the previous permit with minor wording changes.</i> 9VAC25-31-580 outlines record keeping requirements for biosolids. 9VAC25-31-190.J requires all records pertaining to biosolids to be maintained for 5 years, including monitoring information, copies of all reports required by the permit and data used to develop the permit application.
Part III.B.4	<b>Generator NANI:</b> <i>New Requirement.</i> 9VAC25-31-530.F requires the generator of biosolids who provides biosolids to a land applier, to give notice and necessary information to the land applier. 9VAC25-31-480 states that the preparer of biosolids shall ensure that the applicable requirements in 9VAC25-31 Part VI are met when biosolids are land applied. 9VAC25-31-530.F requires that when the preparer of biosolids gives his biosolids to another person who prepares biosolids, the person who provides the biosolids give the person who receives the biosolids notice and necessary information to comply with 9VAC25-31 Part VI.
Part III.B.5	<b>Biosolids Management Plan (BSMP):</b> <i>Updates Part I.F.6.a of the previous permit with changes to what is required to be included in the BSMP.</i> 9VAC25-31-485.G requires the permit holder to maintain and implement a BSMP and specifies its components. In addition to all materials submitted with permit application, which includes an Odor Control Plan (OCP), a Nutrient Management Plan (NMP) and O&M Manual are required. 9VAC25-31-485.G.3, 9VAC25-790-140 and 9VAC25-790-260 – 300 identify minimum requirements to be included in an O&M Manual. Additional requirements are included in 9VAC25-31-100.Q.12. 9VAC25-31-100.Q.6.requires Generator’s OCP and minimum content.
Part III.B.6	<b>Reopener:</b> <i>Identical to Part I.F.11.d of the previous permit.</i> 9VAC25-31-220.C requires inclusion of a reopener clause in the permit to authorize immediate modification of the permit to address changes to standards or requirements for the use or disposal of biosolids, industrial wastewater sludge, or septage.